

Building Skills for and Implementing Course Based Undergraduate Research Experiences (CUREs) across an Environmental Studies Curriculum

Alanna Lecher¹ and Cassandra Korte¹

¹Lynn University

November 26, 2022

Abstract

Course Based Undergraduate Research Experiences (CUREs) are an effective method of teaching students not only content, but also critical thinking, scientific practice, and other skills beneficial to their education and success. They lower the barrier to participation in undergraduate research, thereby increasing access to entry. Thus, CUREs are especially valuable to underperforming students as they are an effective means of bridging the achievement gap. Due to the value and effectiveness of CUREs in student development, Lynn University has implemented a means by which students are exposed to CUREs and skills necessary to complete a CURE throughout the Environmental Studies major curriculum. This presentation will give a description of the curriculum and how CUREs and CURE-required skills are taught throughout the curriculum culminating in a fully independent capstone research project.

Implementing Course Based Undergraduate Research Experiences (CUREs) across an Environmental Studies Curriculum

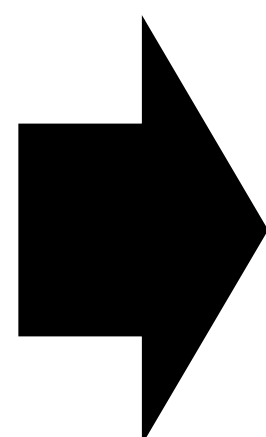
Alanna L. Lecher* & Cassandra Korte

Natural and Applied Sciences, Lynn University, Boca Raton, FL, *alecher@lynn.edu

1. Introduction

- Course Based Undergraduate Research Experiences (CUREs) are highly impactful methods of improving student achievement and retention (Bangera & Brownell, 2014).
- Lynn University placed CUREs throughout the Environmental Studies Major curriculum
 - At the lower division level CUREs are laboratory experiences guided by faculty in which students gather data for faculty research projects
 - At the upper division level, students design and execute social and natural science research projects that increase in length from 3 weeks to a full semester
 - Skills are taught throughout the curriculum. These skills are required to ensure success in designing a research project

Bangera, G., & Brownell, S. E. (2014). Course-based undergraduate research experiences can make scientific research more inclusive. *CBE—Life Sciences Education*, 13(4), 602-606.

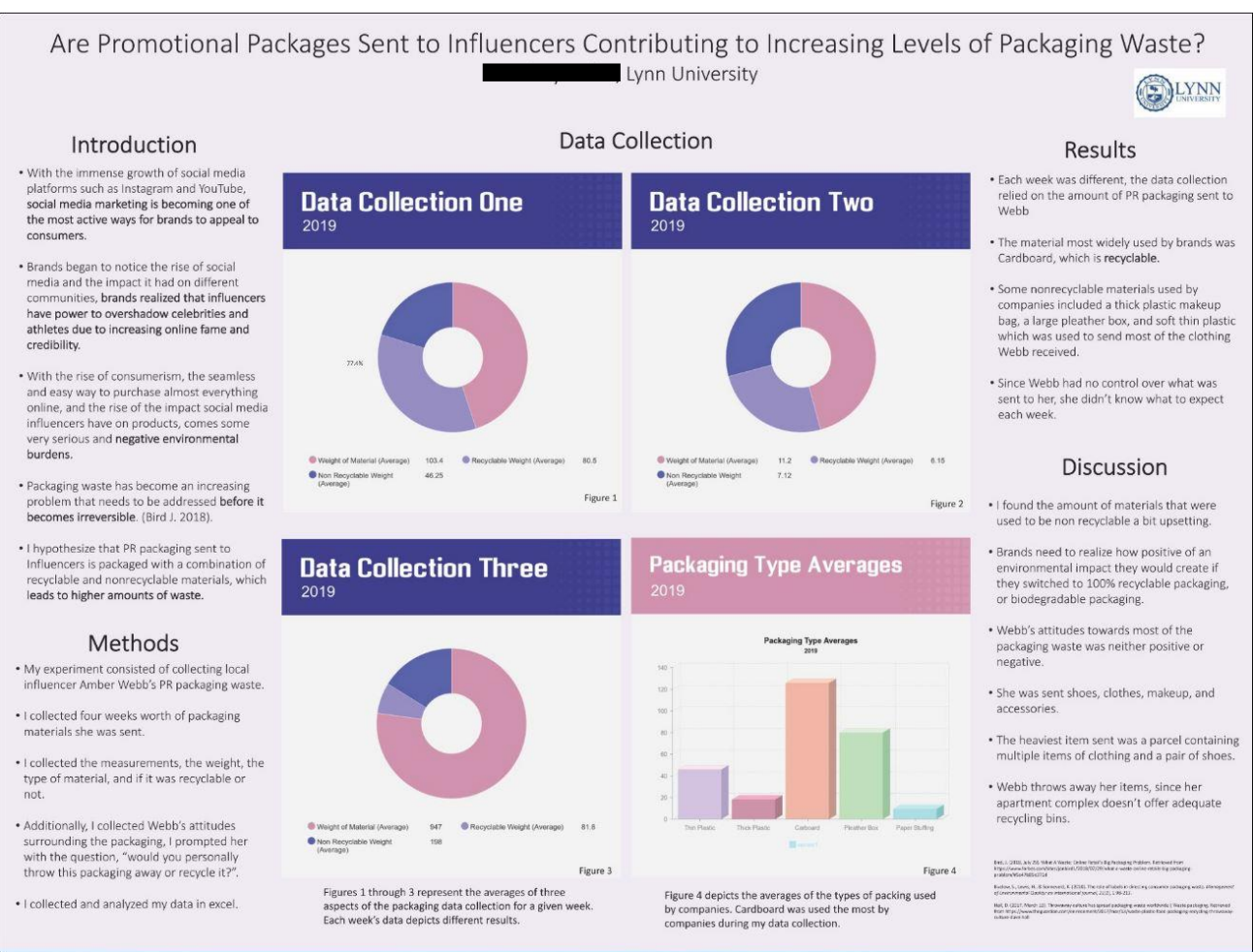


2. Skill-Building Across the Curriculum

Table 1: How CURE-essential skills are developed over the curriculum, culminating in student-designed final projects

Class	Literature Review	Scientific Method Training	Formal Research Project Proposal	Collect Data	Plot and Analyze Data	Computer Skills (Excel, GIS, etc.)	Field/Lab/Survey Techniques	Scientific Writing	Full Project
ENV 130: Human Environment Interactions		x		x			x		
SCI 130: Chemistry 1				x			x		
SCI 110: Biology 1		x	x	x		x	x	x	
DSL 100: Scientific Literacy		x						x	
SOC 200: Research Methods in Social Sciences		x	x				x		
DSL 200: Scientific Literacy	x	x		x				x	
DQR 200: Statistics					x	x			
ENV 250: Environmental Risk and Public Health			x	x	x		x		
ENV 330: Wildlife Conservation				x			x		
ENV 340: Environmental Statistics		x		x	x	x	x	x	x
POL 385: Global Environmental Policy & Justice	x		x	x	x		x		x
ENV 420: Geographic Information Systems				x	x	x		x	x
ENV 450: Capstone in Environmental Studies	x		x	x	x			x	x

4. Upper-Division CUREs

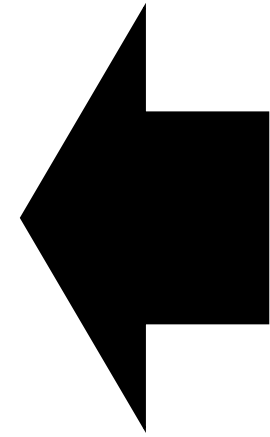


Senior: Capstone Research Project

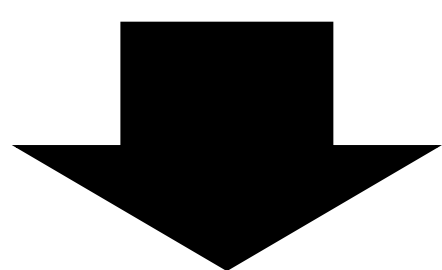
- ENV 450, final semester before graduating
- Students spend 3 weeks designing a research project in natural or social sciences, 8 weeks executing the project, and the remaining time creating a final report and presentation
- Workshop style class sessions work to further a student's progress on their own research

Junior: Authentic Data Analysis

- ENV 340, second semester spring class
- Students access various international and governmental databases on which to perform statistical analyses
- In the final project students collect data on their own or from a database to test a hypothesis



3. Lower-Division CUREs



Sophomore: Bacterial Tolerance Studies

- ENV 250, second year spring class
- Students perform a halotolerance or other tolerance study of bacteria collected from the environment as part of a faculty research project
- Data are used to interpret abundances of bacteria found in the environment

Freshman: Artifact Cleaning and Analysis

- ENV 130, the first semester class
- Students clean and sort artifacts from the summer archeology dig led by faculty
- Students discuss how differing abundances of artifacts during different time periods are indicative of social or environmental change

